

operate in a reactive mode to projects proposed by the state DOT, because there isn't a mechanism in place to coordinate during the important preliminary planning stages of these projects. Rather than being forced to react to proposals to fill wetlands or increase stormwater discharges, CT DEP and DOT should work together during the early stages of projects to promote environmentally-sound approaches to road construction and stormwater management. One strategy might be to establish a workgroup of the appropriate CT DEP and DOT staff to create a mechanism through which the use of best management practices is institutionalized in DOT's capital planning process. Information on the pollutant removal capabilities of different stormwater treatment systems, generated through the NPS Program, will be used to promote the use of the most effective systems.

The CT DEP also must continue its efforts to ensure that nonpoint source pollution from local and state roads, highways, and bridges is controlled, especially when improvements to existing infrastructure are being proposed. On-going training and education for officials in DOT and local departments of engineering and public works must be improved to expand the project design focus to include water quality impact reductions in addition to water quantity issues and to ensure the implementation of best management practices (BMPs). One of the methods currently under development to achieve improvement in this area is an alternatives analysis flow chart to aid DOT and local public works and engineering staff in project designs to improve water quality. The flow chart will compel DOT and local road design officials to consider and evaluate the various best management practices that can be accommodated based on site and other constraints (e.g., presence of sensitive resources, right-of-way limitations, incompatible soils for infiltration, etc.) and explicitly describe why more advanced treatment is not feasible in those instances where such treatment is not proposed.

III. FUTURE DIRECTIONS FOR NONPOINT SOURCE MANAGEMENT

1. INFLUENCING LOCAL LAND USE DECISIONS

Land use regulation in Connecticut and throughout New England is the responsibility of municipal governments, and is effected through zoning ordinances, subdivision regulations, and other assorted authorities. "Home rule" as it pertains to land use regulation has a long and rich history in New England, and as a result, state government has little authority over local land use decision-making. In Connecticut, the state encourages municipalities to consider the goals and policies of the *Conservation and Development Policies Plan for Connecticut*, issued every five years by the state Office of Policy and Management (OPM).

A. STATEWIDE

As described in Section I, the CT DEP has developed numerous manuals and guidance documents describing a wide range of best management practices (BMPs) for different categories of nonpoint source pollution. The state also requires municipalities to enforce two important state laws that influence development proposals: the "Soil Erosion and Sediment Control Act" and "Inland Wetlands and Watercourses Act." Both laws are intended to minimize the adverse impacts of development activities on nearby wetlands and surface water bodies. The CT DEP is currently in the process of updating and revising its *Guidelines for Soil Erosion and Sediment Control*, which serves as guidance on the proper implementation of the state law. A companion training program will be conducted by CT DEP, in conjunction with the soil and water conservation districts, upon its completion in 2000.

Construction activities disturbing five acres or more are subject to the CT DEP's stormwater discharge permit program, which requires developers to adopt stormwater pollution prevention practices during construction. The second phase of this federally-mandated program, which will reduce the size threshold to one acre and therefore bring more construction activities under regulation, will become effective in 2000. To implement these state and local laws and regulations, municipalities routinely require BMPs to protect wetlands and water quality.

B. COASTAL

Coastal municipalities also are required to implement Connecticut's coastal management program through their existing planning and zoning authorities. A process called coastal site plan review (CSPR) enables planning and zoning commissions and boards in coastal municipalities to review most development projects proposed within the coastal boundary to ensure that they will be developed in a manner that avoids, minimizes, and mitigates adverse impacts to coastal resources and coastal water quality. OLISP's *Coastal Water Quality Protection: A Guide for Municipal Officials* and the *Best Management Practices for Coastal Marinas* provide additional information that boards and commissions can use in their decision-making to protect against nonpoint source pollution and to make improvements in stormwater management.

2. CONTROLLING EXISTING NONPOINT SOURCES

Implementing BMPs in existing developed areas is a much more difficult task than it is for new development.

A. URBAN AREAS

Through the state's evolving watershed management program, priority watersheds are subjected to extensive monitoring and assessment activities, which identify opportunities to retrofit existing stormwater management systems, treat uncontrolled runoff, and restore habitat. In the Hockanum River watershed, for example, the Tolland County SWCD worked with a local McDonalds restaurant to install an innovative stormwater treatment system to treat its parking lot runoff. The district is now conducting an outreach program to watershed businesses on how to manage their facilities in a more environmentally-sensitive fashion, including improved stormwater management. As part of the Norwalk River Watershed Initiative, habitat restoration opportunities were identified through a comprehensive assessment by volunteers under CT DEP and USDA Natural Resources Conservation Service (NRCS) direction. Several of these sites have already been restored through a variety of programs and funding sources, including §319. Utilizing this watershed management framework, CT DEP will focus its resources on a subset of selected high priority watersheds, for a

3-5 year period on a rotating basis, initiating 1-2 new projects each year. This schedule will be driven in large part by the need to develop total maximum daily load (TMDL) analyses and implementation plans for §303(d) listed waters.

B. AGRICULTURAL AREAS

Unlike many states, Connecticut doesn't exempt agriculture from environmental regulation. Concentrated animal feeding operations (CAFOs), an important source of agricultural pollution, are now defined as point sources and subject to the National Pollutant Discharge Elimination System (NPDES) program. The CT DEP will continue to work with its federal and state partners, like the USDA NRCS, Connecticut Department of Agriculture, soil and water conservation districts, and University of Connecticut Cooperative Extension System to test BMP effectiveness and promote implementation of the most effective ones to protect the state's waters. In addition to §319, the USDA NRCS has two relatively new programs, the Environmental Quality Incentives Program (EQIP) and Wildlife Habitat Improvement Program (WHIP), designed specifically to fund restoration of riparian buffers and implement other water quality practices. The CT DEP is also working with the University of Connecticut Department of Plant Science and CES to educate agricultural producers on how to reduce or eliminate their pesticide and nutrients while maintaining productivity.

C. COASTAL AREAS

The Coastal Nonpoint Pollution Control Program (CNPCP), developed in accordance with §6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990, requires the implementation of specific management measures within the §6217 management area to ensure against the introduction of significant nonpoint sources of pollution into coastal waters. Implementation of Connecticut's CNPCP will rely heavily on networking existing state and local

authorities, including the state Structures, Dredging and Fill Act and Tidal Wetlands Act, Soil Erosion and Sediment Control Act, Inland Wetlands and Watercourses Act, state coastal management consistency review for state-sponsored projects affecting the coastal boundary, municipal coastal site plan review and other local planning and zoning authorities.

In keeping with §6217 requirements, Connecticut's CNPCP implementation strategy over the next 2-3 years will focus on high priority watersheds as identified by the state's Unified Watershed Assessment, and on the urban category of nonpoint source pollution as established by §6217. CT DEP and other state agencies will have direct responsibility for implementing the CNPCP's management measures and will develop an appropriate mechanism to ensure local implementation of those measures that are not under direct state control. The state's wide-ranging enforcement authority to protect against actual and potential pollution of the state's waters will be utilized in those instances where municipal or other state agency implementation of management measures is lacking.

To improve and enhance municipal implementation of the §6217 management measures, CT DEP will continue an ambitious outreach program for municipal planning and zoning and engineering/public works officials. The outreach program will focus first in the coastal municipalities, especially those located within high-priority watersheds, and gradually moving inland throughout the §6217 management area, again, targeting the same high-priority watersheds. This outreach effort will be coordinated with other appropriate entities including the soil and water conservation districts, the University of Connecticut Cooperative Extension System's NEMO Program, and nonprofit environmental groups and watershed associations.

IV. GETTING MEASURABLE ENVIRONMENTAL RESULTS

Relatively speaking, one could argue that the NPS Program has been successful because, despite population growth and associated new development, water quality in the state has continued to improve. For example, reduced total suspended solids (TSS) and nitrogen concentrations in rivers and streams can be linked to more effective and consistent enforcement of the Soil Erosion and Sediment Control Act, and more recently, implementation of the Stormwater General Permit Program. However, the diffuse nature of nonpoint source pollution makes it difficult to determine whether specific programs or BMPs are responsible for these improvements.

Another approach taken by CT DEP has been to measure the pollutant removal effectiveness of BMPs, either through monitoring or existing data, promote the use of the most effective BMP's on a widespread scale, and assume improvements in water quality will follow. For example, CT DEP has funded monitoring of several BMP's around the state, including four stormwater treatment systems, and a combined wet pond/wetland system at Lake Whitney in Hamden. While monitoring has not been completed yet on the stormwater systems, the Lake Whitney demonstration project was very successful at removing pollutants from an approximately 20-acre residential area. As a result, CT DEP is promoting the use of similar systems around the state and expects similar results.

Because nonpoint source pollution results from the actions of many individuals and from many activities, the state NPS program has emphasized education and outreach aimed at changing certain behaviors. For example, §319 funds have supported the University of Connecticut Cooperative Extension System's (UConn/CES) Integrated Pest/Crop Management Program, which teaches agricultural producers, turf managers, and others to reduce their use of pesticides and fertilizer while maintaining productivity. This program has been successful in measuring actual reductions in the use of high risk pesticides and nutrients. The UConn/CES Nonpoint Education for Municipal Officials (NEMO) program teaches local land use officials about the link between land use and water quality, and the importance of reducing impervious surfaces and using BMPs. Measuring changes in water quality resulting from this program is more difficult, however, because changes in how municipalities regulate new development may be very subtle and take time to effect any real improvements in water quality.

Several watershed projects have involved citizen monitoring programs, including the Sasco Brook and Scantic, and Mattabesset river projects. As part of the Mattabesset River project, erosion from a commercial development adjacent to the river was controlled with the application of several BMPs, measurably reducing sediment loads to the